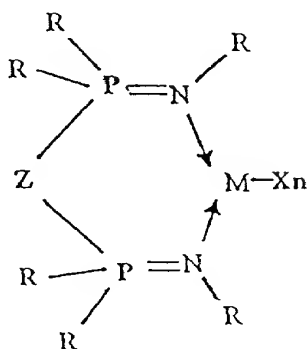


Claims:

1. A transition metal complex having the formula



FORMULA I

wherein M is Fe[II], Fe[III], Ni[II], Co[I], Co[II], Co[III], V[III], Mn[I], Mn[II], Mn[III], Mn[IV], Ru[II], Ru[III] or Ru[IV]; Pd[II], V[III], V[IV] or V[V].

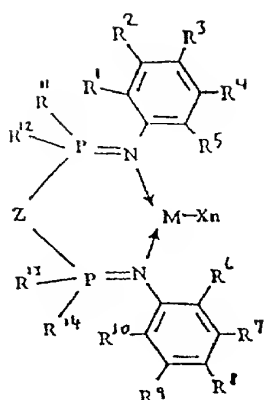
X represents an atom or group covalently or ionically bonded to the transition metal M;

R is independently selected from hydrogen, halogen, hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl or substituted heterohydrocarbyl;

Z is a bridging group comprising a donor atom of N, P or S or alternatively is a neutral group comprising a C<sub>1</sub>-C<sub>4</sub> alkylene group, a silyl or germyl group, and

n = an integer to satisfy the valency of M.

2. A transition metal complex having the formula:



wherein M is Fe[II], Fe[III], Ni[II], Co[I], Co[II], Co[III], V[III], Mn[I], Mn[II], Mn[III], Mn[IV], Ru[II], Ru[III] or Ru[IV]; Pd[II], V[III], V[IV] or V[V].

X represents an atom or group covalently or ionically bonded to the transition metal M;

Z is a bridging group comprising a donor atom of N, P or S or alternatively is a neutral group comprising a C<sub>1</sub>-C<sub>4</sub> alkylene group, a silyl or germyl group,

R<sup>1</sup> - R<sup>14</sup> are independently selected from hydrogen, halogen, hydrocarbyl, substituted

hydrocarbyl, heterohydrocarbyl, or substituted heterohydrocarbyl, and

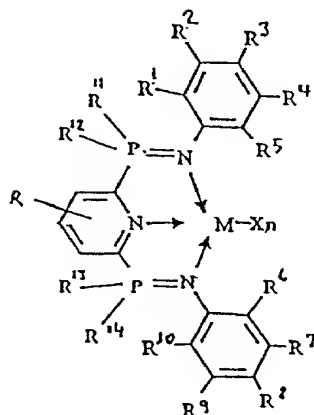
n = an integer to satisfy the valency of M.

3. A complex according to claim 2 wherein at least one of R<sup>1</sup> - R<sup>10</sup> contains two or more carbon atoms.

4. A complex according to claim 2 wherein R<sup>11</sup> - R<sup>14</sup> are phenyl, alkyl or cycloalkyl.

5. A complex according to any of the preceding claims wherein the bridging group Z is -CH<sub>2</sub>- or a donor atom N.

6. A complex according to any of the preceding claims having the formula



wherein M, X and  $R^1 - R^{14}$  and n are as claimed in claim 2, and R is hydrogen or hydrocarbyl.

7. A complex according to any of the preceeding claims wherein the metal M is Fe, Ni or Co.
8. A complex according to any of the preceeding claims wherein the group X is chloride.
- 5 9. A polymerisation catalyst comprising
  - (1) a transition metal complex as defined in any preceeding claim, and
  - (2) an activating quantity of an activator compound.
10. A catalyst according to claim 9 whererin the activator compound is an organoaluminium compound or a hydrocarbylboron compound.
- 10 11. A catalyst according to claim 9 further comprising a neutral Lewis base.
12. A catalyst according to any of claims 9 to 11 further comprising a support.
13. A catalyst according to claim 12 whererin the support is silica, alumina, or zirconia or is a polymer or prepolymer.
14. A catalyst according to any of claims 9 to 13 further comprising a catalyst suitable for the polymerisation of olefins of the type used in conventional Ziegler-Natta catalyst systems, metallocene-based catalysts, monocyclopentadienyl- or constrained geometry based catalysts, or heat activated supported chromium oxide catalysts (eg Phillips-type catalyst).
15. A process for the polymerisation or copolymerisation of olefins comprising contacting a monomeric olefin under polymerisation conditions with a complex or catalyst as defined in any preceeding claim.
- 20 16. A process according to claim 15 wherein the polymerisation conditions are solution phase, slurry phase or gas phase.
17. A process according to claim 16 wherein the polymerisation is conducted under gas phase fluidised bed conditions.
- 25 18. A process according to claim 17 wherein the polymerisation is conducted under condensed mode.
19. A process according to any of claims 14-18 wherein hydrogen is used to control the average molecular weight of the polymer.